CLAIMS

1. A hot dip galvanized composite high strength steel sheet excellent in shapeability and hole enlargement ability characterized by containing, by mass%, C: 0.01 to 0.3%, Si: 0.005 to 0.6%, Mn: 0.1 to 3.3%, P: 0.001 to 0.06%, S:0.001 to 0.01%, Al: 0.01 to 1.8%, and N: 0.0005 to 0.01% and having a balance of Fe and unavoidable impurities, wherein the metal structure is comprised of ferrite and, by area ratio, 5% to 60% of tempered martensite.

2. A hot dip galvanized composite high strength steel sheet excellent in shapeability and hole enlargement ability as set forth in claim 1, characterized in that said hot dip galvanized composite high strength steel sheet further contains, by mass%, one or more of Mo: 0.05 to 0.5%, V: 0.01 to 0.1%, Ti: 0.01 to 0.2%, Nb: 0.005 to 0.05%, Cu: 1.0% or less, Ni: 1.0% or less, Cr: 1.0% or less, Ca: 0.0003 to 0.005%, REM: 0.0003 to 0.005%, and B: 0.0003 to 0.002%.

3. A hot dip galvanized composite high strength steel sheet excellent in shapeability and hole enlargement ability as set forth in claim 1 or 2, characterized in that said hot dip galvanized composite high strength steel sheet further contains Al, by mass%, of 0.25 to 1.8% in range and in that the mass% of Si and Al and the target tensile strength (TS) satisfy the following equation 1:

$$(0.0012\times[\text{TS target value}]-0.29-[\text{Si}])/1.45<\text{Al}<1.5-3\times[\text{Si}] \quad \text{... equation 1}$$

[TS target value]: Design value of tensile strength of steel sheet (MPa), [Si]: Si mass%, Al: Al mass%

4. A method of production of a hot dip galvanized composite high strength steel sheet excellent in shapeability and hole enlargement ability characterized by hot rolling, then cold rolling a slab containing, by mass%, C: 0.01 to 0.3%, Si: 0.005 to 0.6%, Mn: 0.1 to

3.3%, P: 0.001 to 0.06%, S:0.001 to 0.01%, Al: 0.01 to 1.8%, and N: 0.0005 to 0.01% and having a balance of Fe and unavoidable impurities, heating the sheet in a hot dip galvanization heating step to Ac_1 to Ac_3+100°C in temperature, holding it there for 30 seconds to 30 minutes, then cooling it by a 1°C/s or higher cooling rate to 450 to 600°C in temperature, then hot dip galvanizing it at that temperature, then cooling it by a 1°C/s or higher cooling rate to the martensite transformation point or less in temperature, then holding it at 200°C to 500°C in temperature for 1 second to 5 minutes, then cooling it by a 5°C/s or higher cooling rate to 100°C or less so as to obtain a metal structure comprised of ferrite and of tempered martensite of an area rate of 5% to 60%.

5. A method of production of a hot dip galvanized composite high strength steel sheet excellent in shapeability and hole enlargement ability as set forth in claim 4, characterized by performing alloying after said hot dip galvanization.

6. A method of production of a hot dip galvanized composite high strength steel sheet excellent in shapeability and hole enlargement ability as set forth in claim 4 or 5, characterized by said further treating a galvanized layer or galvannealed layer by one or more of a chromate treatment, inorganic coating film treatment, chemical conversion, or resin coating film treatment.

7. A method of production of a hot dip galvanized composite high strength steel sheet excellent in shapeability and hole enlargement ability as set forth in any one of claims 4 to 6, characterized in that said hot dip galvanized composite high strength steel sheet further contains, by mass%, one or more of Mo: 0.05 to 0.5%, V: 0.01 to 0.1%, Ti: 0.01 to 0.2%, Nb: 0.005 to 0.05%, Cu: 1.0% or less, Ni: 1.0% or less, Cr: 1.0% or less, Ca: 0.0003 to 0.005%, REM: 0.0003 to 0.005%, and B:

0.0003 to 0.002%.

8. A method of production of a hot dip galvanized composite high strength steel sheet excellent in shapeability and hole enlargement ability as set forth in any one of claims 4 to 7, characterized in that said hot dip galvanized composite high strength steel sheet further contains Al, by mass%, in 0.25 to 1.8% in range and in that the mass% of Si and Al and a target tensile strength (TS) satisfy the following equation 1:

(0.0012×[TS target value]-0.29-[Si])/1.45<Al< 1.5-3×[Si]... equation 1

[TS target value]: Design value of tensile strength of steel sheet (MPa), [Si]: Si mass%, Al: Al mass%

9. A method of production of a hot dip galvanized composite high strength steel sheet excellent in shapeability and hole enlargement ability as set forth in any one of claims 4 to 8, characterized by, from said cold rolling to the hot dip galvanization heating step, preplating one or more of Ni, Fe, Co, Sn, and Cu to 0.01 to 2.0 g/m^2 per surface of the steel sheet.

10. A method of production of a hot dip galvanized composite high strength steel sheet excellent in shapeability and hole enlargement ability as set forth in claim 9, characterized by pickling the steel sheet before said preplating.